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# **Perchlorate Medical Advisory Group (PMAG)**

Thursday, June 26, 2003  
7:00 – 9:00 P.M.

Santa Clara County Public Health Department  
Social Services Conference Room  
80 Highland Avenue, San Martin, CA 95046

## **- AGENDA -**

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|-------|---|-----------|
| I.    | Introductions   | 7:00-7:05 |
| II.   | Minutes: Approve minutes from PMAG – April 22, 2003                                   | 7:05-7:10 |
| III.  | Sylvia Hamilton: PCAG Update  | 7:10-7:15 |
| IV.   | Marty Fenstersheib: Perchlorate Legislation<br>& Public Health Resources Up-Date      | 7:15-7:20 |
| V.    | Kevin Mayer: US Environmental Protection Agency                                       | 7:20-7:40 |
| VI.   | Christine Jesser: Report on Data Availability<br>& Summary of Bibliography & Articles | 7:40-8:10 |
| VII.  | Janie Burkhart: Planning & Next Steps   | 8:10-8:45 |
| VIII. | Next Meeting  | 8:45-9:00 |

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	<a href="#">Contents Display</a>	

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## H.R.1588

### National Defense Authorization Act for Fiscal Year 2004 (Public Print)

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#### **SEC. 331. PUBLIC HEALTH ASSESSMENT OF EXPOSURE TO PERCHLORATE.**

##### *(a) EPIDEMIOLOGICAL STUDY OF EXPOSURE TO PERCHLORATE-*

*(1) IN GENERAL- The Secretary of Defense shall provide for an independent epidemiological study of exposure to perchlorate in drinking water.*

*(2) PERFORMANCE OF STUDY- The Secretary shall provide for the performance of the study under this subsection through the Centers for Disease Control, the National Institutes of Health, or another Federal entity with experience in environmental toxicology selected by the Secretary for purposes of the study.*

*(3) MATTERS TO BE INCLUDED IN STUDY- In providing for the study under this subsection, the Secretary shall require the Federal entity conducting the study--*

*(A) to assess the incidence of thyroid disease and measurable effects of thyroid function in relation to exposure to perchlorate;*

*(B) to ensure that the study is of sufficient scope and scale to permit the making of meaningful conclusions of the measurable public health threat associated with exposure to perchlorate, especially the threat to sensitive subpopulations; and*

*(C) to study thyroid function, including measurements of urinary iodine and thyroid hormone levels, in a sufficient number of pregnant women, neonates, and infants exposed to perchlorate in drinking water and match measurements of perchlorate levels in the drinking water of each study participant in order to permit the development of meaningful conclusions on the public health threat to individuals exposed to perchlorate.*

*(4) REPORT ON STUDY- The Secretary shall require the Federal entity conducting the study under this subsection to submit to the Secretary a report on the study not later than June 1, 2005.*

##### *(b) REVIEW OF EFFECTS OF PERCHLORATE ON ENDOCRINE SYSTEM-*

(1) *IN GENERAL*- The Secretary shall provide for an independent review of the effects of perchlorate on the human endocrine system.

(2) *PERFORMANCE OF REVIEW*- The Secretary shall provide for the performance of the review under this subsection through the Centers for Disease Control, the National Institutes of Health, or another appropriate Federal research entity with experience in human endocrinology selected by the Secretary for purposes of the review. The Secretary shall ensure that the panel conducting the review is composed of individuals with expertise in human endocrinology.

(3) *MATTERS TO BE INCLUDED IN REVIEW*- In providing for the review under this subsection, the Secretary shall require the Federal entity conducting the review to assess--

(A) available data on human exposure to perchlorate, including clinical data and data on exposure of sensitive subpopulations, and the levels at which health effects were observed; and

(B) available data on other substances that have endocrine effects similar to perchlorate to which the public is frequently exposed.

(4) *REPORT ON REVIEW*- The Secretary shall require the Federal entity conducting the review under this subsection to submit to the Secretary a report on the review not later than June 1, 2005.

#### ***Subtitle D--Reimbursement Authorities***

### ***SEC. 341. REIMBURSEMENT OF RESERVE COMPONENT MILITARY PERSONNEL ACCOUNTS FOR PERSONNEL COSTS OF SPECIAL OPERATIONS RESERVE COMPONENT PERSONNEL ENGAGED IN LANDMINES CLEARANCE.***

(a) *REIMBURSEMENT*- Funds authorized to be appropriated under section 301 for Overseas Humanitarian, Disaster, and Civic Aid programs shall be available for transfer to reserve component military personnel accounts in reimbursement of such accounts for the pay and allowances paid to reserve component personnel under the United States Special Operations Command for duty performed by such personnel in connection with training and other activities relating to the clearing of landmines for humanitarian purposes.

(b) *MAXIMUM AMOUNT*- Not more than \$5,000,000 may be transferred under subsection (a).

(c) *MERGER OF TRANSFERRED FUNDS*- Funds transferred to an account under this section shall be merged with other sums in the account and shall be available for the same period and purposes as the sums with which merged.

(d) *RELATIONSHIP TO OTHER TRANSFER AUTHORITY*- The transfer authority under this section is in addition to the transfer authority provided under section 1001.

### ***SEC. 342. REIMBURSEMENT OF RESERVE COMPONENT ACCOUNTS FOR COSTS OF INTELLIGENCE ACTIVITIES SUPPORT PROVIDED BY RESERVE COMPONENT PERSONNEL.***

# PERCHLORATE

U.S. EPA, Region 9



What is Perchlorate - Chemistry & Uses  
Brief History of Environmental Concern  
Toxicity  
Occurrence  
Regulatory Status  
Treatment Technologies  
Ecology and Agriculture



# Perchlorate CHEMISTRY



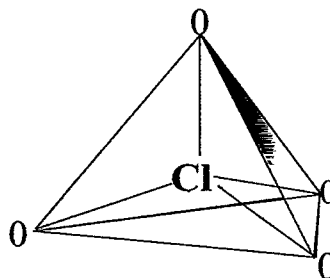
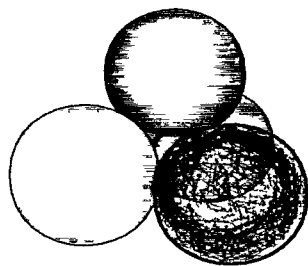
**Dissolves and Moves Like Salt in Water**

**Highly Soluble, Mobile, Stable**

**Hard to Treat by Usual Methods**

**Hard to Detect Below 400 ppb,  
until March 1997 Method to 4 ppb**

## PERCHLORATE



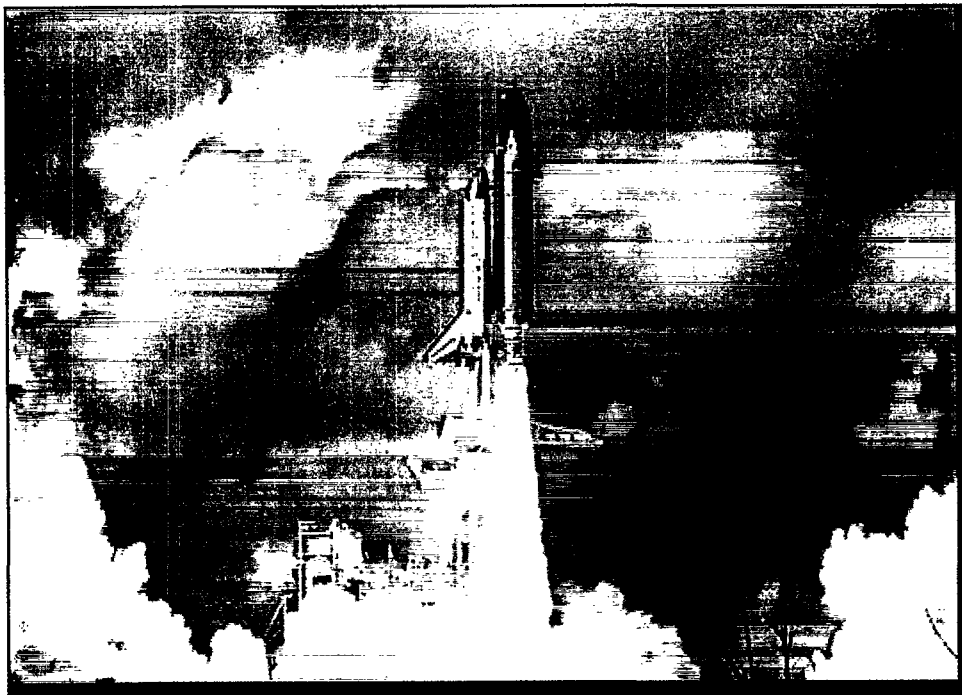
# **USES of PERCHLORATE**

**90% Manufactured for Solid Rocket Fuel**

**Explosives**

**Fireworks, Flares and Smoke Markers**

**Reported in Nitrate Fertilizer from Chile**



## **PERCHLORATE HISTORY Before 1997**

**1980s - Aware of Perchlorate Use at  
CA and NV Superfund sites**

**1985-86 - San Gabriel Valley Superfund Site  
- Tested in Groundwater, but Data Invalid**

**1990s - Rancho Cordova (Aerojet)  
- Discovered at > 1000 ppb in Groundwater**



## **PERCHLORATE HISTORY Before 1997**

**1992 and 1995 - Provisional Reference Dose  
(4-18 ppb)**

**1997 - Analytical Breakthrough to 4 ppb**

**1997 and 1998 – Region 9 Alerts EPA  
HQ, Regions, and States**





## **Perchlorate TOXICOLOGY Before 1997**

**Blocks Iodide Uptake into Thyroid,  
Disrupts Production of Hormones**

**Human Drug Tests in 1950's**

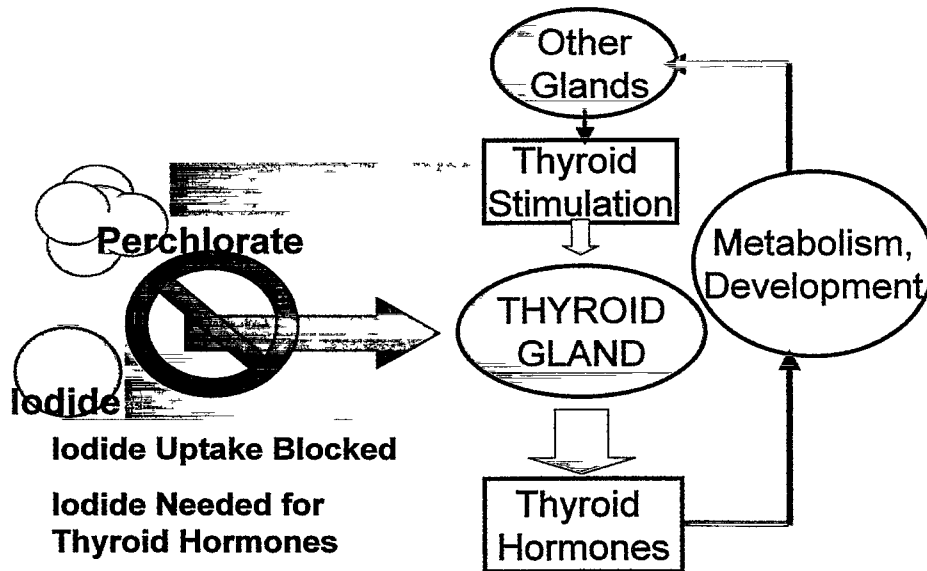
**EPA Provisional Reference Dose 1992/95  
Range of 4 to 18 ppb in Drinking Water**

**Before 1998, No Data on Children's Health  
or Chronic Effects**

**1000x Uncertainty Factors**



### **Perchlorate Mode of Action**



## What is a REFERENCE DOSE (RfD)?



Science Based Only, Not a Regulation

DOSE is mg chemical per kg body wt. / day

$$\text{RfD} = \frac{\text{No or Lowest Observed Effect Level}}{\text{Uncertainty Factors}}$$

## Toxicology EPA Interpretations From January 2002 Draft



Animal Studies Used to Measure Impact

Effects on Brain Development in Rat Pups

Draft Reference Dose of 0.00003 mg/kg-day

Adult Drinking Water Equivalent = 1 ppb

Only 300x Uncertainty Factors

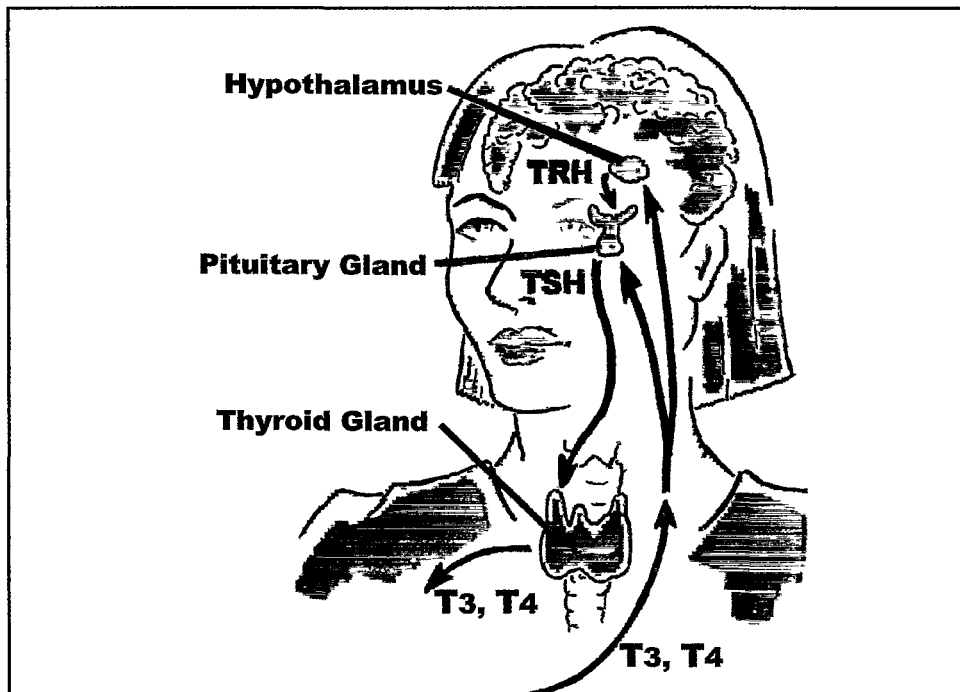
**EPA 2002 Draft**  
**TOXICITY SCHEDULE**

**January – June 2002 External Peer Review**

**Expected Final Draft in Spring 2003**

**2003 National Academy of Sciences Review**

**2004 (approx.) Revised Reference Dose on  
Integrated Risk Information System (IRIS)**

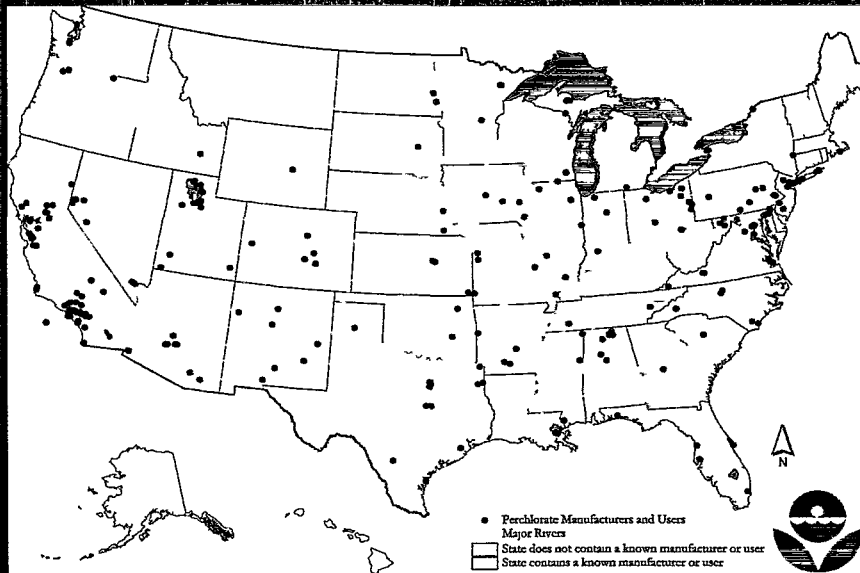


# PERCHLORATE SHIPMENTS



**Manufacturer's Information  
from Region 9 Superfund Requests  
About 240 facilities  
40+ States  
Most Information in Last 20 Years**

## PERCHLORATE MANUFACTURERS and USERS



APRIL, 2003

# PERCHLORATE in the ENVIRONMENT



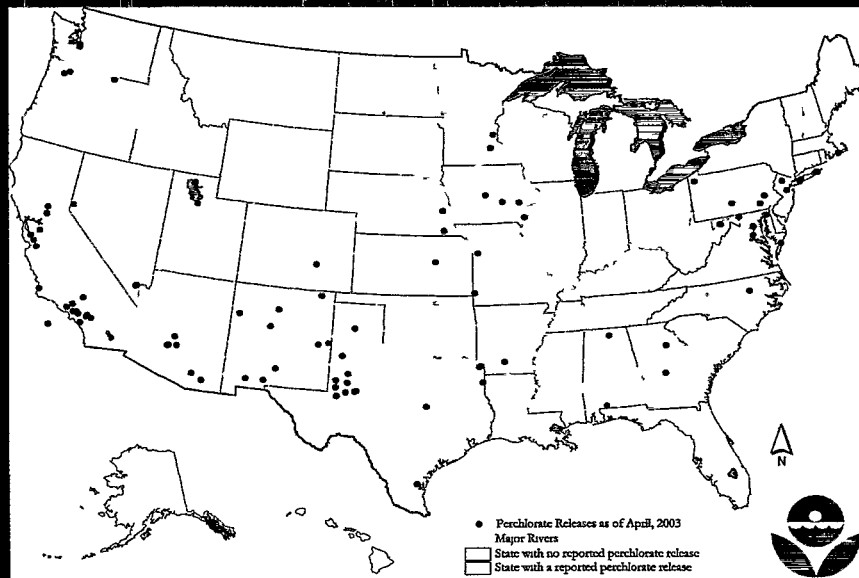
## RELEASES REPORTED IN 29 STATES

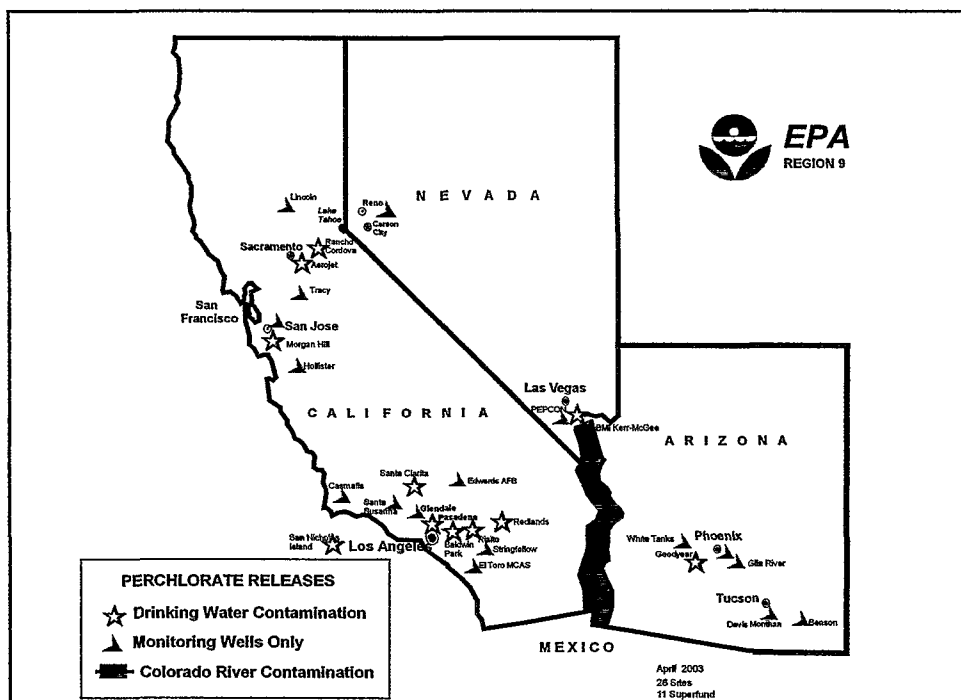
AL, AZ, AR, CO, GA, IA, KS, MD, MO, MA, MN, NE, NV, NJ, NM, NY, NC, OR, PA, TX, UT, VA, WA, WV, also FL, LA, MS, RI since April

## CALIFORNIA

Over 5600 Water Supply Wells Tested  
Detected in 319 sources, 5.6 %

## PERCHLORATE RELEASES – April, 2003





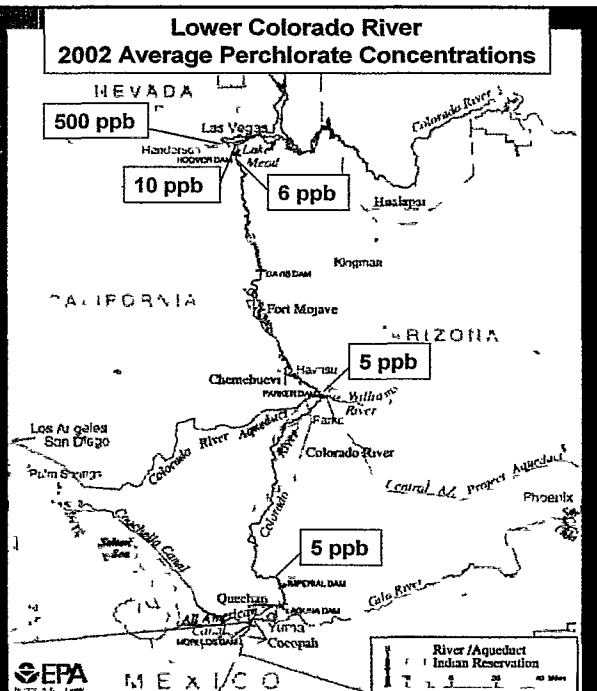
In 1997, 900 pounds per day entered Lake Mead

By 2001, about 500 pounds per day

Measurable entire 300 miles to Mexico

Used by Las Vegas  
Los Angeles, San Diego, Phoenix and agriculture

Water supply for over 15 million people



## **Regulatory Authority**



**EPA has exercised authority under  
SDWA, RCRA, CERCLA**

**Standards are site-specific, no federal standard**

**Contaminant Candidate List to consider  
possible Drinking Water Standard (MCL)**

**EPA's MCL Process takes several years (2008?)**

**Possible EPA Health Advisory (Office of Water)**

**States and Tribes are developing Standards**

## **State "Advisories"**



**California... 4 ppb**

**New York... 5 ppb and 18 ppb**

**Texas... 4 ppb, 7 ppb or 10 ppb**

**Arizona... 14 ppb**

**Massachusetts... 1 ppb**

**Maryland... 1 ppb**

**New Mexico... 1 ppb**

**Nevada... 18 ppb**

# **Perchlorate Treatment**

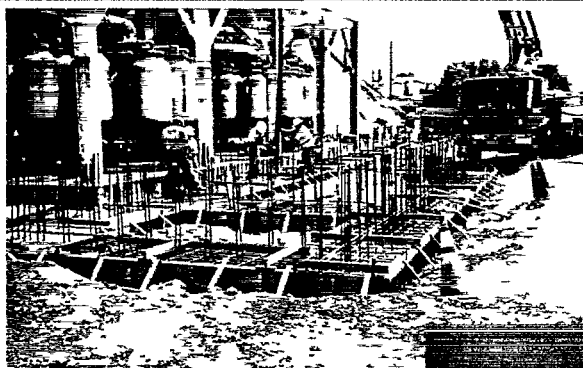
**Treatment Systems are Operating**

**Full Scale, Commercially Available**

**Ion Exchange – Regenerate or Dispose**

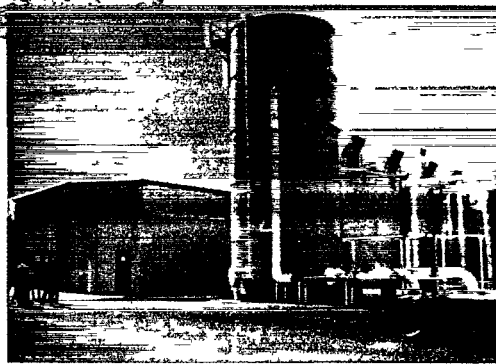
**Various Types of Biological Systems**

**Reverse Osmosis for Small Systems**



**Ion Exchange for  
Groundwater  
Treatment,  
San Gabriel  
Superfund Site  
Baldwin Park, CA**

**Fluidized Bed  
Bioreactors at Aerojet  
Superfund Site  
Rancho Cordova, CA**





## Ecological Risks



**Direct Effects on Fish/Animals observed  
at High Concentrations**

**Unknown Effects at Lower Concentrations**

**Agriculture Uses Colorado River and GW**

- Lettuce near Yuma
- Many Crops in Imperial Valley/Coachella Valley
- Citrus in Riverside



# Perchlorate INFORMATION



U.S EPA Technology Innovation Office  
[www.clu-in.org/perchlorate](http://www.clu-in.org/perchlorate)

American Water Works Assn Research  
[www.awwarf.com/research/spperch.asp](http://www.awwarf.com/research/spperch.asp)



